## INTRODUCTION

This report is a summary of comments from the Peer Review Panel at the FY 2004 DOE Hydrogen Program Annual Merit Review, held on May 24-27, 2004, at the Philadelphia Downtown Marriott in Philadelphia, Pennsylvania. The work evaluated in this document supports DOE and the results of this merit review and peer evaluation are major inputs utilized by the Department in making its funding decisions for the next fiscal year.

The objectives of this meeting were to:

- Review and evaluate FY 2004 RD&D accomplishments and FY 2005 plans for DOE laboratory programs and industry/university cooperative agreements.
- Provide an opportunity for program participants (hydrogen production manufacturers, hydrogen storage manufacturers, fuel cell manufacturers, etc.) to help shape the DOE sponsored R&D program so that the highest priority technical barriers are addressed. The meeting also serves to facilitate technology transfer.
- Foster interactions among the universities, industry and national laboratories conducting the R&D.

During the plenary session on the first morning, all four DOE offices involved in Hydrogen Fuel Initiative activities (FE, NE, EE and SC) each gave overviews of their programs. Those presentations became a prelude to the 2005 Annual Merit Review, which will expand in scope to cover projects of the entire DOE Hydrogen Program. Projects from FE, EE and NE will be reviewed next year, and an introduction to the set of projects to be awarded by SC in 2005 will be provided.

The Peer Review process followed the guidelines of the Peer Review Guide developed by EERE. The Peer Review Panel members, listed in Table 1, attended the meeting and provided comments on the projects presented. These panel members are peer experts from a variety of hydrogen and fuel cell related backgrounds including national laboratories, hydrogen production manufacturers, hydrogen storage manufacturers, fuel cell manufacturers, universities, and other U.S. Government agencies. They were screened from a conflict of interest (COI) perspective per the Peer Review Guide. A complete list of the meeting participants is presented as Appendix A.

**Table 1: Merit Review Panel Members**

| No. | Name | Organization |
|---|---|---|
| 1 | Radoslav Adzic | Brookhaven National Laboratory |
| 2 | Michele Anderson | Office of Naval Research |
| 3 | Raymond Anderson | Idaho National Engineering and Environmental Laboratory |
| 4 | Don Anton | United Technologies Research Center |
| 5 | Tim Armstrong | Oak Ridge National Laboratory |
| 6 | Paolina Atanassova | Cabot Superior Micropowders |
| 7 | Carol Bailey | SENTECH, Inc. |
| 8 | Addison Bain | Consultant |
| 9 | Jay Bauman | DuPont Fuel Cells |
| 10 | Farshad Bavarian | Chevron Texaco |
| 11 | Bud Beebe, SMUD | Sacramento Municipal Utility District |

| No. | Name | Organization |
|---|---|---|
| 12 | Thomas Benjamin | Argonne National Laboratory |
| 13 | Larry Blair | Consultant |
| 14 | Alex Bogicevic | Ford |
| 15 | Rod Borup | Los Alamos National Laboratory |
| 16 | Lynnae Boyd | National Renewable Energy Laboratory |
| 17 | Dick Bradshaw | Stirling Strategic Services, LLP |
| 18 | Rich Carlin | Office of Naval Research |
| 19 | Eric Carlson | TIAX |
| 20 | William Chernicoff | Department of Transportation – Volpe |
| 21 | Russell R. Chianelli | University of Texas at El Paso |
| 22 | Prashant Chintawar | Nuvera |
| 23 | Hongli Dai | DuPont |
| 24 | Davison, Brian | Oak Ridge National Laboratory |
| 25 | Mark Debe | 3M |
| 26 | Emory DeCastro | Etek Denora |
| 28 | Glenn Eisman | Plug Power |
| 29 | Feinberg, Ed | Consultant |
| 30 | Karl Fiegenschuh | Ford |
| 31 | Scott Freeman | DaimlerChrysler |
| 32 | Don Frikken | Becht Engineering Company St Louis Office |
| 33 | Alexi Gabrielov | Shell Hydrogen |
| 34 | Esin Gulari | National Science Foundation |
| 35 | David Haberman | IF,LLC |
| 36 | Pat Hagans | UTC Fuel Cells |
| 37 | Jim Hansel | Air Products and Chemicals, Inc. |
| 38 | Mike Heben | National Renewable Energy Laboratory |
| 39 | Shinichi Hirano | Ford |
| 40 | Nashat Jalil | Daimler Chrysler |
| 41 | Craig Jensen | University of Hawaii |
| 42 | Will Johnson | W L Gore |
| 43 | Scott Jorgensen | GM |
| 44 | Maurice | State of Hawaii |
| 45 | Michael Kelly | Millennium Cell, Inc. |
| 46 | John Kerr | Lawrence Berkeley National Laboratory |
| 47 | John Kopasz | Argonne National Laboratory |
| 48 | Theodore Krause | Argonne National Laboratory |
| 49 | Romesh Kumar | Argonne National Laboratory |
| 50 | Daniel Loffler | IdaTech |
| 51 | Melissa Lott | QSS Group, Inc. |
| 52 | Andy Lutz | Sandia National Laboratories |
| 54 | Len Marianowski | Gas Technology Institute |
| 55 | David Masten | GM |

| No. | Name | Organization |
|---|---|---|
| 56 | Jim McGrath | Virginia Tech |
| 57 | Gerald Meyer | Johns Hopkins University |
| 58 | Jeremy Meyers | UTC Fuel Cells |
| 59 | Mike Miller | Southwest Research Institute |
| 60 | William S. Millman | Office of Basic Energy Sciences, DOE |
| 61 | Kevin Mills | U.S. Army |
| 62 | Michael Niehues | DaimlerChrysler |
| 63 | George Parks | Conoco Philips |
| 64 | Richard Paur | Army Research Office |
| 65 | Larry Pederson | Pacific Northwest National Laboratory |
| 66 | Guido Pez | Air Products & Chemicals, inc. |
| 67 | Harold L. Phillippi | Exxon Mobil Research and Engineering |
| 68 | Walter Podolski | Argonne National Laboratory |
| 69 | Michael Quah | NextEnergy |
| 70 | Rick Rocheleau | Hawaii Natural Energy Institute |
| 71 | Mark Roelofs | DuPont |
| 72 | Jerry Rogers | GM |
| 73 | Philip Ross | Lawrence Berkeley National Laboratory |
| 74 | Gary Sandrock | SunaTech, Inc. |
| 75 | Bill Schank | Ford |
| 76 | Ed Schmetz | Department of Energy |
| 77 | Jesse M. Schneider | DaimlerChrysler RTNA |
| 78 | Andreas Shell | DaimlerChrysler |
| 79 | John Shen | Department of Energy |
| 80 | Ron Sims | Consultant (retired Ford) |
| 81 | Carl Sink | Department of Energy |
| 82 | William Smith | Infinity Fuel Cell and Hydrogen, LLC |
| 83 | Rhoads Stephenson | Motor Vehicle Fire Research Institute |
| 84 | Ken Stroh | Los Alamos National Laboratory |
| 85 | Robert Sutton | Argonne National Laboratory |
| 86 | Scott Swartz | NexTech |
| 87 | Amy Taylor | Department of Energy/NE |
| 88 | George Thomas | Sandia National Laboratories |
| 89 | Levi Thompson | University of Michigan |
| 90 | Doanh Tran | DaimlerChrysler |
| 91 | James Ulhlein | BP |
| 92 | Francisco Uribe | Los Alamos National Laboratory |
| 93 | Suellen V Ooteghem | Brookhaven National Laboratory |
| 94 | Nick Vanderborgh | Consultant |
| 95 | Victor Maroni | Argonne National Laboratory |
| 96 | Gerald Voecks | GM |
| 97 | Fred Wagner | GM |

| No. | Name | Organization |
|---|---|---|
| 98 | Brian Weeks | Texas Energy Center |
| 99 | Jim Wegryzn | Brookhaven National Laboratory |
| 101 | Doug Wheeler | Consultant |
| 102 | John Williams | Quantum |
| 103 | Keith Wipke | National Renewable Energy Laboratory |
| 104 | Chris Wolverton | Ford |
| 105 | Bob Wysocki | Shell |
| 106 | Bob Zalosh | Worcester Polytechnic Institute |
| 107 | Tom Zawodzinski | Case Western Reserve University |
| 108 | Ragaiy Zidan | Savannah River National Laboratory |

## SUMMARY OF MERIT REVIEW PANEL'S CROSS CUTTING COMMENTS AND RECOMMENDATIONS

The Peer Review Panel members provided a number of comments and recommendations that apply to the Annual Merit Review and peer review process, as well as overall management of the DOE Hydrogen Program. These comments are provided in Appendix B of this report. DOE will utilize these comments to improve both the program and future review meetings.

## ANALYSIS METHODOLOGY

As shown in Table 1, a total of **108** panel members participated in the merit review process. A total of **164** project presentations were given at the meeting and a total of **1095** review sheets were received from the Peer Review Panel (not every panel member reviewed every project). These members were asked to provide numeric scores (on a scale of one to four, with four being the highest) for five aspects of the research on their Evaluation Form, a sample of which can be found as Appendix C to this report.

The five aspects were:

- Relevance to overall DOE objectives;
- Approach to performing the research and development;
- Technical accomplishments and progress toward achieving the project and DOE goals;
- Technology transfer and collaborations with industries, universities, and other laboratories; and
- Approach to and relevance of proposed future research.

The numeric scores given to each project by the reviewers were averaged to provide the overall score for that project for each of the five criteria. An average score for the five criteria was also calculated within each of the project categories. In this manner, a project's overall score can be compared to other projects in that category.

Reviewers were also asked to provide qualitative comments on the five research aspects, as well as the specific strengths and weaknesses of the project, and any recommendations for additions or deletions to the work scope.

These comments, along with the quantitative scores, were placed into a database for easy retrieval and analysis. These comments are summarized in the following sections.

**ORGANIZATION OF THE REPORT**

This report is organized in six sections, in an effort to group projects according the sub program in which they fall in DOE Hydrogen Program planning. A brief description of the general type of research being performed in each category is presented.

The remaining pages of each section present the results of the analysis for each of the projects discussed at the merit review. A summary of the qualitative comments is provided, as well as graphs showing overall score and how the particular project compared with all other projects presented. An example of a graph is provided below: